IN THE CLAIMS

This listing of the claims supercedes all previous versions. Please amend the claims as indicated below.

1. (Currently amended) A bovine beta-casein gene targeting vector comprising

(1) a first region having a length of ~~5 to 12~~ about 6 kb which is homologous to the promoter and its flanking nucleic acid sequences of bovine beta-casein gene, and comprising exon 1, intron 1, and exon 2 of bovine beta-casein gene;

(2) a region for cloning a nucleic acid coding for desired proteins;

(3) a region for coding a positive selection marker;

(4) a second region having a length of 2.8 to 3.5 kb which is homologous to the nucleic acid sequences of bovine beta-casein gene, and comprising exon 5, 6, 7 and 8, and intron 5, 6 and 7 of bovine beta-casein gene;

wherein the nucleic acid segment corresponding to the first region is located upstream to the nucleic acid segment corresponding to the second region in the 5' -3' arrangement of beta-casein gene.

2. Canceled.

3. (Original) The vector according to claim 1, wherein the length of the second region is 3.0 to 3.2 kb.

4. (Original) The vector according to claim 1, wherein the positive selection marker is selected from the group consisting of neomycin (Neo), hygromycin (Hyg), histidmol dehydrogenase gene (hisD) and guanine phosphosribosyltransferase (Gpt).

5. (Original) The vector according to claim 1, wherein the vector further comprises a region for a negative selection marker.

6.(Original) The vector according to claim 5, wherein the negative selection marker is Diphtheria toxin (DT) gene.

7. (Currently amended) A vector according to claim 1 or 5 which is pBCKI I , pBCKI II, pBCKIDT I or pBCKIDTII, ~~is~~ as presented in FIG. 1, FIG. 2, FIG. 16, or FIG. 3, respectively.

8. (Currently amended) An isolated bovine somatic cell produced by introducing ~~which is beta-casein gene-targeted with the~~ vector according to claim 1 or 5 into an isolated bovine somatic cell and permitting the insertion of the DNA construct of the vector into the endogenous beta-casein gene by homologous recombination.

9. (Currently amended) An isolated bovine embryo produced by introducing the nucleus of ~~which is nuclear-transferred with the~~ bovine somatic cell according to claim 8 into an enucleated bovine oocyte to produce a bovine embryo.

10. (Currently amended) A method for producing a bovine beta-casein gene-targeted somatic cell which comprises the steps of

(1) introducing the bovine beta-casein gene-targeting vector according to claim 1 or 5 into ~~an~~ a bovine ~~somatic~~ embryonic cell or fibroblast cell;

(2) occurring homologous recombination events in the bovine ~~somatic~~ embryonic cell or fibroblast cell; and

(3) selecting the bovine beta-casein gene-targeted bovine ~~somatic~~ embryonic cell or fibroblast cell with a desired gene by homologous recombination.

11. (~~Original~~Currently amended) The method according to claim 10, wherein the vector in the step (1) is introduced ~~into cells~~ in form of linearized or deleted form lacking plasmid vector backbone.

12. (Currently amended) A method for generating transgenic cattle which comprises the steps of

(1) introducing the bovine beta-casein gene-targeting vector according to claim 1 or 5 into a bovine ~~somatic~~ embryonic cell or fibroblast cell;

(2) occurring homologous recombination events in the bovine ~~somatic~~ embryonic cell or fibroblast cell;

(3) selecting the bovine beta-casein gene-targeted ~~somatic~~ embryonic cell or fibroblast cell with a desired gene by homologous recombination;

(4) introducing the ~~gene-targeted~~embryonic cell or fibroblast cell into a nuclear-removed bovine embryo to produce a nuclear-transferred embryo; and

(5) implanting the embryo into a recipient.

13. (Currently amended) A method of obtaining a large scale of desired proteins from milk of the transgenic cattle, in accordance with the method of claim 12.